

What is claimed is:

1. A displacement pump for dispensing a predetermined volume of fluid comprising:
a cylindrical chamber coupled to a fluid dispensing outlet, the cylindrical chamber
5 defining an internal volume for storing at least the predetermined volume of fluid
a piston slidable in the cylindrical chamber towards the fluid dispensing outlet;
a threaded drive rod connected to the piston;
a stepper motor in threaded engagement with the threaded drive rod, the stepper
motor rotatable by a number of steps to slide the piston towards the fluid dispensing outlet by
10 a distance corresponding to the predetermined volume; and
anti-rotation means coupled to the threaded drive rod for inhibiting rotation thereof
relative to the stepper motor.
2. The displacement pump according to claim 1, wherein the fluid dispensing outlet
15 includes a first one-way check valve.
3. The displacement pump according to claim 2, further including a fluid inlet coupled to
the cylindrical chamber, the fluid inlet including a second one-way check valve.
- 20 4. The displacement pump according to claim 3, wherein the fluid dispensing outlet and
the fluid inlet are integrated within a front flange, the front flange having a recessed portion
for receiving the cylindrical chamber.
5. The displacement pump according to claim 3, further including a storage tank having
25 a rigid fluid conduit coupled to the fluid inlet.
6. The displacement pump according to claim 5, wherein the storage tank includes an
aperture for receiving fluid, and a tank cap for covering the aperture.

7. The displacement pump according to claim 6, wherein the tank cap is configured for sealing the aperture, the tank cap further including a third one way check valve for allowing entry of air into the storage tank while preventing exit of fluid vapor from the storage tank.
- 5 8. The displacement pump according to claim 1, wherein the piston includes a piston seal.
9. The displacement pump according to claim 8, wherein the piston seal includes contact edge having a width to resisting bowing.
- 10 10. The displacement pump according to claim 1, wherein the anti-rotation means includes
a guide tube having one end coupled to the cylindrical chamber and another end coupled to the stepper motor, the guide tube housing a portion of the threaded drive rod,
a rod guide fixed to the threaded drive rod and slidable within the guide tube, the rod
15 guide matingly engaging an inner surface of the guide tube to inhibit rotation of the threaded drive rod.
11. The displacement pump according to claim 10, wherein the guide tube has a length substantially equal to the length of the cylindrical chamber.
- 20 12. The displacement pump according to claim 1, wherein the cylindrical chamber is constructed of acrylic.
13. The displacement pump according to claim 1, further including a sensor to detect
25 when the threaded drive rod reaches a fully withdrawn position.
14. A dispensing system for providing a predetermined volume of fluid corresponding to a user selection, comprising:
a user interface for providing electrical selection signals in response to the user
30 selection;

- a microprocessor for receiving the electrical selection signals and accessing stored displacement pump calibration data in response to the electrical selection signals, the microprocessor calculating the predetermined volume of fluid to dispense corresponding to the electrical selection signals and the stored displacement pump calibration data, for
5 providing pump control data;
a pump driver for receiving the pump control data and providing motor drive signals;
and,
a displacement pump including
a cylindrical chamber coupled to a fluid dispensing outlet, the cylindrical
10 chamber defining an internal volume for storing at least the predetermined volume of fluid,
a piston slidable in the cylindrical chamber towards the fluid dispensing outlet,
a threaded drive rod connected to the piston,
a stepper motor in threaded engagement with the threaded drive rod, the
15 stepper motor rotating in response to the motor drive signals by a number of steps to slide the piston towards the fluid dispensing outlet by a distance corresponding to the predetermined volume of fluid, and
anti-rotation means coupled to the threaded drive rod for inhibiting rotation thereof relative to the stepper motor.
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15. The dispensing system according to claim 14, wherein the user interface includes a button panel for receiving the user selection.
16. The dispensing system according to claim 15, wherein the button panel is arranged to
25 represent categories of variables.
17. The dispensing system according to claim 14, wherein the user interface includes an LCD panel.
- 30 18. The dispensing system according to claim 14, wherein user interface includes a communication port for receiving programming data.

19. The dispensing system according to claim 18, wherein the communication port includes a wired port.
- 5 20. The dispensing system according to claim 18, wherein the communication port includes a wireless port.
21. The dispensing system according to claim 14, further including
a plurality of displacement pumps, and
10 a relay system for selectively coupling the motor drive signals to one of the plurality of displacement pumps.
22. The dispensing system according to claim 14, wherein each of the plurality of displacement pumps is coupled to a corresponding plurality of storage tanks.
- 15 23. The dispensing system according to claim 22, wherein the plurality of displacement pumps and the corresponding plurality of storage tanks are contained within a cabinet.
24. The dispensing system according to claim 23, wherein the fluid dispensing outlet of
20 each of the plurality of displacement pumps is coupled by a flexible tube to a nozzle cap mounted to the cabinet.
25. The dispensing system according to claim 24, wherein the nozzle cap includes a plurality of individual channels, each individual channel being coupled to one of the flexible
25 tubes.